

Appl. No. 10/721,932
Reply to Examiner's Action dated August 23, 2005

REMARKS/ARGUMENTS

The Applicants have carefully considered this application in connection with the Examiner's Action and respectfully request reconsideration of this application in view of the following remarks.

The Applicants originally submitted Claims 1-25 in the application. In response to a previous Election Requirement, the Applicants withdrew Claims 22-25. Presently, the Applicants have neither amended, canceled nor added any claims. Accordingly, Claims 1-21 are currently pending in the application.

I. Rejection of Claims 1-4 and 8-10 under 35 U.S.C. §102

The Examiner has rejected Claims 1-4 and 8-10 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,162,583 to Yang, *et al.* ("Yang") in view of U.S. Patent No. 6,713,310 to Song, *et al.* ("Song") and further in view of U.S. Patent No. 5,897,713 to Tomioka, *et al.* ("Tom"). Independent Claims 1 and 11 currently include the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. The combination of Yang, Song and Tom fails to teach or suggest this claimed element.

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Yang is directed to a method for making intermetal dielectrics (IMD) on semiconductor integrated circuits using low dielectric constant spin-on-polymers. (Title) Yang teaches that an IMD2 18 may be used as a stop layer to form a via hole 2 to a metal line 14. However, as the Examiner correctly points out, Yang fails to teach or suggest that its IMD2 18 comprises an aluminum oxide etch stop layer, as well as that the etchant used to etch the IMD3 20 located over the IMD2 18 uses a flow rate of carbon oxide greater than about 80 sccm and is selective to the aluminum oxide etch stop layer.

The Examiner, nonetheless, brings in Song for the teaching or suggestion that the IMD2 18 of Yang may comprise an aluminum oxide etch stop layer, and further brings in Tom for the teaching or suggestion that the etchant uses a flow rate of carbon oxide greater than about 80 sccm and is selective to the aluminum oxide etch stop layer. However, the Examiner is using hindsight to combine Yang with Song and Tom, to arrive at the presently claimed invention. As the Examiner must be aware, motivation based upon hindsight is improper. Thus, the combination of Yang, Song and Tom is improper.

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Without even addressing whether Song does teach or suggest the aluminum oxide etch stop layer, and further whether Tom does teach or suggest the claimed flow rate of the carbon oxide, the combination of Yang with Song and/or Tom is improper. Namely, there is no motivation in any of the references to combine their teachings. Specifically, none of the references acknowledges the benefits of using the aluminum oxide etch stop layer as an etch stop layer, in conjunction with the acknowledgement of the benefits of using an etchant that uses a flow rate of carbon oxide greater than about 80 sccm. Without this recognition, which would take substantial experimentation, or another similar recognition, which would presumably also take substantial experimentation, one skilled in the art would not make such a combination.

Thus, each of Yang, Song and Tom fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Moreover, the combination of Yang with Song and/or Tom is improper for the reasons stated above. Accordingly, the cited references fail to establish a prima facie case of obviousness with respect to these claims. Claims 1-4 and 8-10 are therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 1-4 and 8-10 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

II. Rejection of Claims 11-14 and 18-20 under 35 U.S.C. §102

The Examiner has rejected Claims 11-14 and 18-20 under 35 U.S.C. §103(a) as being unpatentable over Yang in view of Song, and further in view of Tom. As previously indicated,

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independent Claims 1 and 11 currently include the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. As previously established, each of Yang, Song and Tom fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Moreover, as also previously established, the combination of Yang with Song and/or Tom is improper for the reasons stated above. Accordingly, the cited references fail to establish a prima facie case of obviousness with respect to these claims. Claims 11-14 and 18-20 are therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 11-14 and 18-20 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

III. Rejection of Claim 7 under 35 U.S.C. §102

The Examiner has rejected Claim 7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,324,683 to Fitch, *et al.* ("Fitch") in view of Song, and further in view of Tom. As previously indicated, independent Claims 1 and 11 currently include the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. However, as the Examiner correctly points out, Fitch also fails to teach or suggest that its etch stop layer comprises

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an aluminum oxide etch stop layer, as well as that the etchant used to etch the substrate located over the etch stop layer uses a flow rate of carbon oxide greater than about 80 sccm and is selective to the aluminum oxide etch stop layer. Moreover, for the same reasons that the combination of Yang, Song and Tom is improper, the combination of Fitch, Song and Tom is improper.

Therefore, each of Fitch, Song and Tom fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Moreover, the combination of Fitch with Song and/or Tom is improper for the reasons stated above. Accordingly, the cited references fail to establish a prima facie case of obviousness with respect to this claim. Claim 17 is therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claim 17 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

IV. Rejection of Claim 17 under 35 U.S.C. §102

The Examiner has rejected Claim 17 under 35 U.S.C. §103(a) as being unpatentable over Fitch in view of Song, and further in view of Tom. As previously indicated, independent Claims 1 and 11 currently include the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. As previously established, each of Fitch, Song and Tom

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fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Moreover, as also previously established, the combination of Fitch with Song and/or Tom is improper for the reasons stated above. Accordingly, the cited references fail to establish a prima facie case of obviousness with respect to this claim. Claim 17 is therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claim 17 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

V. Rejection of Claims 5 and 15 under 35 U.S.C. §102

The Examiner has rejected Claims 5 and 15 under 35 U.S.C. §103(a) as being unpatentable over Yang in view of Song and Tom, and further in view U.S. Patent Pub. No. 2003/0127422 to Tsuchiya ("Tsu"). As previously indicated, independent Claims 1 and 11 currently include the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. As previously established, each of Yang, Song and Tom fails to teach or suggest the invention recited in independent Claims 1 and 11 and their dependent claims, when considered as a whole. Moreover, as also previously established, the combination of Yang with Song and/or Tom is improper.

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Tsu fails to correct the deficiencies of Yang, Song and Tom. Specifically, Tsu fails to teach or suggest the element of etching an opening in the substrate using an etchant comprising a carbon oxide, a fluorocarbon, an etch rate modulator, and an inert carrier gas, wherein a flow rate of the carbon oxide is greater than about 80 sccm and the etchant is selective to the aluminum oxide etch stop layer. Accordingly, the cited references fail to establish a prima facie case of obviousness with respect to these claims. Claims 5 and 15 are therefore not obvious in view of the combination.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 5 and 15 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

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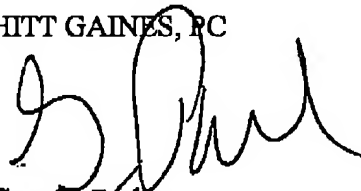
VI. Conclusion

In view of the foregoing remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-21.

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application. The Commissioner is hereby authorized to charge any fees, credits or overpayments to Deposit Account 20-0668.

Respectfully submitted,

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